CLAIMS

What is claimed is:

1. An ion implanter for implanting ions into a target wafer comprising:

an ion source;

an atomic mass unit (AMU) analyzing magnet having a fixed radius R_{am};

an ion extraction voltage source,

a communication interface adapted to monitor implantation parameters including an extraction voltage V_E of the source of implanting ions and a real-time magnetic flux density B of a magnetic field of the AMU analyzing magnet generated by a beam current flowing through the analyzing magnet,

an equipment server having a data log, wherein the equipment server is in communication with the ion implanter and is in further communication with the communication interface for monitoring parameters communicated from the ion implanter to the equipment server data log during operation of the ion implanter, wherein the parameters are the B and the V_E of the source of implanting ions from the ion implanter.

2. The ion implanter of claim 1 being a medium current ion implanter.

3. The ion implanter of claim 1 wherein an atomic mass unit of a desired ion being implanted (m) using the implanter is less than 50 atomic mass units.

4. The ion implanter of claim 1 further comprising:

means for calculating an estimated real-time radius R_e of ions being implanted by the ion implanter, wherein the means for calculating being located in at least one of the ion implanter, the equipment server, and a remote device in communication with the equipment server.

5. The ion implanter of claim 4, wherein the means for calculating is an arithmetic processor capable of solving an equation for R_e in accordance with the following equation:

$$R_e = \frac{(m^* \ V_E)^{\wedge(0.5)}}{B}$$

wherein m = the atomic mass of a desired ion to be implanted.

6. A method of using an ion implanter, the method comprising the step of:

providing an ion implanter having:

an atomic mass unit analyzing magnet having a radius R_{am}, and

a communication interface adapted to monitor implantation parameters including an ion extraction voltage V_E of an ion source of implanting ions and a real-time magnetic flux density B of a magnetic field of the AMU analyzing magnet; and

determining in real-time if an ion implanter is implanting a desired ion into a target wafer.

7. The method of claim 6, further comprising the step of:

determining an offset between the R_{am} and a real-time estimated radius of a circular path of each of a plurality of ions having a desired AMU (m) being implanted (Re).

8. The method of claim 7, further comprising the step of:

providing a predetermined radius tolerance level L.

9. The method of claim 8, further comprising the step of:

determining if an absolute value of the offset between R_{am} and R_e is greater than the predetermined radius tolerance level L.

10. The method of claim 8 wherein the step of providing a predetermined radius tolerance level L further comprises the step of:

using a plurality of implantation data to ensure that an AMU of an ion being implanted has less than a .5 AMU difference from an AMU of a desired ion to be implanted, wherein the plurality of implantation data is selected from data relating to a plurality of ions each having predefined AMUs, each of the plurality of ions associated with a monitored B and a monitored V_E; and

calculating a plurality of implantation radii associated with each of the plurality of ions each having predefined AMUs.

11. The method of claim 8, further comprising the step of:

setting a predefined radius tolerance level equal to .02.

12. The method of claim 7, further comprising the steps of:

a) calculating the R_e for each of the plurality of ions being implanted;

b) subtracting Re from Ram after calculating R_e for each of the plurality of ions being implanted;

c) determining an absolute value of the calculated offset between R_{am} and Re.

13. The method of claim 9, further comprising the steps of:

using the communication interface to monitor both the

B of the AMU analyzing magnet and the V_E of the ion source associated with each of the plurality of ions being implanted by the ion implanter;

storing the monitored parameters B of the AMU analyzing magnet and the V_E of the ion source associated with each of the plurality of ions being implanted by the ion implanter in the equipment server data log; and

using the stored parameters B and V_E to calculate the Re.

14. The method of claim 13, wherein the step of using the stored parameters B and V_E to calculate the Re further comprises the step of:

solving for the R_e in accordance with the following formula

$$R_e = \frac{(m^* \ V_E)^{\wedge(0.5)}}{B}$$

wherein m=atomic mass unit of a desired ion to be implanted.

15. The method of claim 9 further comprising:
signaling an alarm if $|R_{am}-R_e|>L$.

16. The method of claim 9 further comprising the step of:
stopping operation of the ion implanter if $|R_{am}-R_e|>L$.

17. A method of using an ion implanter, the method comprising the step of:
providing an ion implanter having:
an atomic mass unit analyzing magnet having a radius R_{am}, and
a communication interface adapted to monitor implantation parameters including an ion extraction voltage V_E of an ion source of implanting ions and a real-time magnetic flux density B of a magnetic field of the AMU analyzing magnet;
calculating a real-time estimated radius R_e of a circular path for each of a plurality of ions having a desired AMU (m) being implanted;
determining an offset between the R_{am} and the R_e a real-time estimated radius of a circular path of each of a plurality of ions having a desired AMU (m) being implanted (R_e);
providing a predetermined radius tolerance level L;
determining if an absolute value of the offset between R_{am} and R_e is greater than the predetermined radius tolerance level L; and
recalibrating the ion implanter if $|R_{am}- R_e|>L$.

18. The method of claim 17, wherein the step of calculating R_e is performed in accordance with the following equation:

$$R_e = \frac{(m^* \ V_E)^{\wedge(0.5)}}{B}$$

wherein m=atomic mass unit of a desired ion to be implanted.